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REMARKS

I. Status of Claims

Claims 1 - 18, 27 - 32, and 34 - 37 are pending. Claims 19 - 26 and 33 have been cancelled.

Favorable reconsideration of the remaining claims is respectfully requested in light of the following remarks. Applicants request withdrawal of the outstanding objections and rejections, and allowance of the claims.

II. Response to Rejection of claims 1, 3 - 6, 8, 12 - 13, 15 - 17 and 27 - 33 under 35

U.S.C. §102(b) and/or §103(a)

In the Office Action the Examiner rejected claims 1, 3 - 6, 8, 12 - 13, 15 - 17 and 27 - 33 under 35 U.S.C. §102(b) and/or §103(a) over the U.S. Patent No. 3,525,604 to Van Dornick. Applicants contend that all the claims are patentable over the Van Dornick reference and request withdrawal of the rejections under 35 U.S.C. §§102(b) and 103(a).

The independent claims 1, 12, 15, 27, 29 and 31 now recite embodiments of a "glass-melting furnace" having an elongated channel. The elongated channel consists of a charge end wall, a discharge end wall, two side walls, a floor, and a roof. The elongated channel of the furnace defines both "melting" and "fining" ends. These amendments are being made in response to the Examiner's statement that the Van Dornick reference may include furnace additions.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the Applicants' claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

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The Van Dornick furnace requires both an internal dam, or weir, 35 and an overflow dam 16 in order to accumulate non-metallic residues. In particular, the Van Dornick reference, from at least column 5, line 20 through column 6, line 66, is dedicated to explaining the importance of the weir 35 and the removal of slag from the furnace.

The Van Dornick reference also requires both the weir 35 and the dam 16 in order to remove the slag layer that had been formed in the furnace and which protected the melted metal. The Van Dornick reference requires two additional structures within its combustion chamber 11 so that the slag layer can be removed. Those skilled in the art would not consider the additional dam and weir structures, positioned at two different sections of the Van Dornick furnace (i.e., at the middle and at the end of the combustion chamber) as being useful in a glass melting furnace.

The Van Dornick reference is focused on the problems with separating the desired end product from the residues formed in the metal refining process. Those skilled in the art would not consider a refining metal furnace as suitable for producing a homogeneous product such as glass. In contrast, in a glass making furnace, all the ingredients are blended and melted together to form the molten glass.

There is nothing in the Van Dornick reference that would give the artisan any reason to change the Van Dornick metal refining furnace configuration by removing the weirs and dams in order to make glass. There would be no reason to look at such Van Dornick furnace for a process to combine and melt glass-forming materials where no residue is formed during the melting and fining of the ingredients into molten glass.

In summary, there is no teaching or suggestion in the Van Dornick reference which provides the novel combination of: i) a glass-melting furnace having a melting end and a fining end through which molten glass is discharged; ii) an exhaust in communication with a downstream fining end of the furnace; and, iii) the exhaust being positioned so that combustion gases are *only* exhausted from such exhaust.

The Van Dornick reference did not address, let alone purport to solve, the problems found in glass making furnaces, which problems are solved by the present invention. Rather, in prior art glass-melting furnaces, the velocity of the gases was

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greatest above the unmelted glass forming materials. This velocity caused the undesired entrainment of the combustion fumes and gases releases from the decomposition of the glass-forming raw materials. The present invention provides a novel solution having gases exhausted only from the exhaust at the downstream end of the glass-melting furnace.

Accordingly, Applicants request withdrawal of the rejections of the claims under 35 U.S.C. §102(b) and/or 35 U.S.C. §103(a).

Claims 3-6, 8, 13, 16-17, 28, 30 and 32 are dependent claims and should be allowable for at least the same reasons as set forth above. Accordingly, Applicants request withdrawal of the rejections of the claims under 35 U.S.C. §102(b) and/or 35 U.S.C. §103(a).

III. Response to Rejection of claims 2, 7 10 - 11 and 18 under 35 U.S.C. §103(a)

In the Office Action the Examiner rejected claims 2, 7 10 - 11 and 18 under 35 U.S.C. §103(a) over the Van Dornick reference in view of the U.S. Patent No. 5,925,165, to Pflügl (hereinafter "Pflügl").

When applying 35 U.S.C. § 103, the cited references must be considered as a whole, must suggest the desirability and thus the obviousness of making the combination, and must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182 187 n.5 (Fed. Cir. 1986).

Claims 2, 7 and 10 - 11 depend from independent claim 1, and claim 18 depends from independent claim 15. Thus, these dependent claims are allowable over Van Dornick for at least the reasons set forth above.

Another reason these claims are further patentably distinct over the Van Dornick and the Pflügl references is that the Pflügl reference describes an incinerator for refuse where slag is melted and heavy metals are separated at three different chambers within the melt furnace. In the Pflügl reference, gases are exhausted out of all three chambers. (See, for example, in Fig. 1 in the Pflügl reference, arrow 15, arrow 26 and arrow 39).

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The Pflügl reference thus fails to address the need to prevent the "exhaust from being removed only at the downstream end of the furnace", which problem is solved by the present invention.

Neither the Van Dornick nor the Pflügl reference suggests a glass-melting furnace having either an elongated channel as now claimed or a charger to supply glass-forming material or an exhaust positioned only at a downstream end of the furnace.

In addition, claims 7, 10 - 11 and 18 recite embodiments having at least two exhaust stacks which are positioned or located at the downstream end of the furnace. The Van Dornick reference fails to disclose at least two exhaust stacks. The Pflügl reference also fails to teach or disclose at least two exhaust stacks which are positioned at the downstream end of the furnace. Instead, the Pflügl reference discloses two exhaust stacks positioned at the upstream end of a furnace.

There is no suggestion in the Van Dornick reference that the stack at the downstream end could be a plurality of stacks, or in the Pflügl reference that the stacks be positioned at the upstream end instead of the downstream end. In the absence of such suggestions, the Examiner has failed to establish a prima facie case of obviousness. Accordingly, claims 7, 10 - 11 and 18 should be allowable over the Van Dornick and Pflügl references in their own right.

There is no teaching or suggestion in either the Van Dornick or Pflügl references to combine features from such different kinds of furnaces as a metal refining furnace or a refuse incinerator, neither of which are configured to melt glass materials into molten glass in an elongated channel, as now described in the claims. The Van Dornick furnace heats materials to refine metal materials and separate out slag by-products. The Pflügl furnace heats and incinerates solid refuse to separate out different types of materials. No one skilled in the art would look to the teachings in either the Van Dornick or Pflügl references to combine a metal refining furnace with a refuse incinerator in order to provide a furnace where a homogenous product is formed (i.e., by melting materials into molten glass).

Finally, the Examiner also argues that the "such a combination would provide for a

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more even heating of the melted material in the furnace of Van Dornick." There is no teaching in either the Van Dornick or the Pflügl reference that even heating of the materials is desired. Rather, neither the Van Dornick nor the Pflügl references are concerned about even heating since the furnaces are used to separate out materials, rather than form a melted and blended end product such as glass.

Accordingly, claims 7, 10-11 and 18 should be allowable over Van Dornick and Pflügl in their own right.

Accordingly, Applicants request withdrawal of the rejection of the claims under 35 U.S.C. §103(a).

IV. Response to Rejection of claims 9 and 14 under 35 U.S.C. §103(a)

In the Office Action the Examiner rejected claims 9 and 14 under 35 U.S.C. §103(a) over Van Dornick in view of the U.S. Patent No. 6,519,973, to Hoke (hereinafter "Hoke").

Claims 9 and 19 depend from claims 1 and 15, respectively, and should be allowable over Van Dornick for at least the reasons set forth above.

Another reason these claims are further patentably distinct over the Van Dornick and the Hoke references is that the Hoke fails to cure the deficiencies in the Van Dornick reference. The Examiner admitted that Van Dornick does not disclose an exhaust that is located at a sidewall of the furnace. For this teaching, the Examiner relies on Hoke, asserting that Hoke discloses a glass melting furnace where exhausts are located at sidewalls of the furnace. However, claim 14 recites two exhausts, wherein each exhaust is separated laterally from the sidewalls. Hoke fails to disclose two exhausts, each separated laterally from the sidewalls, as set forth in claim 14. In the absence of such teaching, claim 14 should be allowable over Van Dornick and Hoke in its own right.

Accordingly, Applicants request withdrawal of the rejection of the claims under 35 U.S.C. §103(a).

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V. Response to Rejection of claims 34 - 37 under 35 U.S.C. §103(a)

In the Office Action the Examiner rejected claims 34 - 37 under 35 U.S.C. §103(a) over Van Dornick in view of the U.S. Pub. No. 2001/0039813 to Simpson (hereinafter "Simpson") or U.S. Patent No. 6,237,369,973, to LeBlanc (hereinafter "LeBlanc").

Claims 34 - 37 depend from claim 1 and should be allowable over Van Dornick for at least the reasons set forth above.

The claims 34 - 37 provide additional structurally unique features to the claimed invention. Claim 34 recites a fining zone within the glass-melting furnace and at least one downstream burner supplying heat to the fining zone. Claim 35 recites that the downstream burner is mounted in the roof. Claim 36 recites that at least one upstream burner is mounted at an angle of up to about 20 degrees to the vertical. Claim 37 recites that the downstream burner is mounted at an angle of up to about 20 degrees to the vertical.

The Simpson and Leblanc references fail to cure the deficiencies in the Van Dornick reference. The Examiner admitted that Van Dornick does not disclose a burner for supplying heat to the downstream fining end. For this teaching, the Examiner relies on Simpson and/or Leblanc, asserting that Simpson and/or Leblanc disclose a glass melting furnace where a burner is installed in the roof. Neither the Simpson nor LeBlanc reference, however, teaches or suggests upstream and downstream burners in combination with an exhaust positioned at the downstream end of at least one burner whereby the exhaust is in communication with the downstream end of the furnace so that combustion gases in the glass-melting furnace are exhausted only from the exhaust at the downstream end of the glass-melting furnace.

Accordingly, Applicants request withdrawal of the rejection of the claims 34 - 37 under 35 U.S.C. §103(a).

VI. Conclusion

In view of the above amendments to the claims and the remarks herein, it is submitted that the specification, drawings and claims are in proper form.

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Claims 1 - 18, 27 - 32 and 34 - 37 are in proper form for allowance. The invention, as defined in the pending claims, is neither disclosed nor suggested by the references of record. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections and rejections of record, and allowance of all claims.

VII. Request for Telephone Interview

As a final matter, if the Examiner has any suggestions concerning different claim phraseology that, in the opinion of the Examiner, more accurately defines the present invention, prior to issuance of another Office Action, Applicants' attorney or agent requests the courtesy of a telephone interview at the Examiner's earliest convenience to discuss the application. Applicants' attorney or agent may be contacted at (740) 321-7168.